

*Recordare*



# MusicXML: Methodology and Technical Methods

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# Outline

- ◆ Personal introduction
- ◆ What is MusicXML?
- ◆ Design methodology
- ◆ Technical methods
  - MusicXML use today
  - Suitability for digital music editions
- ◆ Recommendations
- ◆ Future directions



# My Background

- ◆ B.S. and M.S. in computer science from Massachusetts Institute of Technology
- ◆ B.S. thesis on representing scores in Music11
- ◆ Trumpet on MIT Symphony Orchestra recordings available on Vox/Turnabout
- ◆ Opera and symphony chorus tenor; have performed for Alsop, Nagano, Ozawa
- ◆ Worked in software usability at SAP and DEC before founding Recordare in 2000





# What is MusicXML?

- ◆ The first standard computer format for common Western music notation
- ◆ Covers 17<sup>th</sup> century onwards
- ◆ Available via a royalty-free license
- ◆ Supported by over 60 applications, including Finale, Sibelius, capella, and music scanners
- ◆ Useful for music display, performance, retrieval, and analysis applications
- ◆ Based on industry standard XML technology



# The Importance of XML

- ◆ XML is a language for developing specialized formats like MusicXML, MathML, and ODF
- ◆ XML files can be read in any computer text editor
- ◆ Fully internationalized via Unicode
- ◆ The files are human readable as well as machine readable
- ◆ Each specialized format can use standard XML tools
- ◆ Allows musicians to leverage the large software investments made by big industry



# MusicXML Milestones

October 2000	MusicXML 0.1
September 2001	SharpEye Music Reader
May 2002	Dolet for Finale on Windows
August 2003	Dolet for Sibelius
January 2004	MusicXML 1.0
August 2004	Dolet for Finale on Mac OS X
May 2005	MusicXML 1.1
July 2005	Sibelius 4 and Finale 2006

# MusicXML Support





# Design Methodology (1)

- ◆ Start with the best prior formats for music notation
  - MuseData (Walter Hewlett, CCARH)
  - Humdrum (David Huron, Ohio State)
  - Avoid the mistakes made by NIFF and SMDL
- ◆ Represent the score in a musical way
  - Design for playback as well as printing
  - Use musical terms, not computer terms
  - Use readable names
- ◆ Avoid design by committee pitfalls
  - Community is involved in design decisions
  - Use PDF as an open standards model





# Design Methodology (2)

- ◆ Develop format and software together
  - If it did not work with either Finale or Sibelius, nobody would use it
  - Best way to make sure that the format meets musician's needs
  - Support all types of repertoire: classical, jazz, pop
- ◆ Ensure long-term compatibility
  - Waited several years to release 1.0
  - Newer versions do not make incompatible changes
  - Support and involve the user community



# in MusicXML (1 of 3)

```
<part id="P1">
  <measure number="1" width="179">
    <attributes>
      <divisions>24</divisions>
      <key>
        <fifths>3</fifths>
        <mode>major</mode>
      </key>
      <time>
        <beats>2</beats>
        <beat-type>4</beat-type>
      </time>
      <clef>
        <sign>G</sign>
        <line>2</line>
      </clef>
    </attributes>
```



## in MusicXML (2 of 3)

```
<direction placement="above">  
  <direction-type>  
    <words default-y="25" font-size="10.5" font-weight="bold"  
      relative-x="-42">Nicht schnell</words>  
  </direction-type>  
  <sound tempo="42"/>  
</direction>  
<direction placement="above">  
  <direction-type>  
    <dynamics default-y="10" relative-x="-5">  
      <p/>  
    </dynamics>  
  </direction-type>  
  <sound dynamics="54"/>  
</direction>
```



# in MusicXML (3 of 3)

```
<note default-x="141">  
  <pitch>  
    <step>C</step>  
    <alter>1</alter>  
    <octave>5</octave>  
  </pitch>  
  <duration>12</duration>  
  <voice>1</voice>  
  <type>eighth</type>  
  <stem default-y="-50">down</stem>  
  <lyric default-y="-80" number="1">  
    <syllabic>single</syllabic>  
    <text>Aus</text>  
  </lyric>  
</note>  
</measure>
```



# Examples of MusicXML Use Today

- ◆ More efficient music preparation
  - Composer uses one program while publisher uses another
  - Transfer score from West End to Broadway
  - High fidelity translations from print to online formats
  - Use new programs like Notion
- ◆ Empower performing musicians
  - Transposable, downloadable editions
  - Better music scanning for transposing and arranging
  - Digital music stands with automatic page turns
  - Create play-along CDs for study



# Sibelius to Finale

Es muß ein Wunderbares sein

Franz Liszt

*Schwebend* *p*

Voice

Piano

*pp*

Es muß ein Wun - der - ba - res

Original as entered into Sibelius

[Title]

[Composer]

Voice

Piano

Imported into Finale via MIDI

Es muß ein Wunderbares sein

Franz Liszt

*Schwebend* *p*

Voice

Piano

*pp*

Es muß ein Wun - der - ba - res

Imported into Finale via MusicXML

# High Fidelity Going From Print to Online Editions



The screenshot shows the SongSelect website interface. At the top, the 'SongSelect' logo is on the left and 'DEMO' is on the right. Below the logo is a navigation menu with links: 'INTRO', 'GETTING STARTED', 'ACCOUNT TYPES', 'THE PLAYER', 'LEAD SHEETS', and 'JOIN NOW'. The main content area is titled 'You Are Good' and includes the text 'Words and Music by Israel Houghto'. The musical score is displayed in three systems, with lyrics underneath. The first system shows the key signature G and tempo 129. The second system shows the lyrics 'Lord, You are good, and Your mer - cy en - dur - eth for'. The third system shows the lyrics 'ev - er, Lord, You are good and Your'. On the left side, there is a 'CONTROLS' panel with a volume slider, a key/tempo/metronome section (currently set to G and 129), and a list of chords: A FLAT, G FLAT, F SHARP, and F. There are also checkboxes for 'LORD I LIFT YOUR NAME ON HIGH', 'OPEN OUR EYES', and 'OPEN THE EYES OF MY HEART'. At the bottom right, there are logos for 'MUSIC rain' and 'CCLI'.

# Digital Music Stands with Automatic Page Turns



MuseBook Score  
for Piano

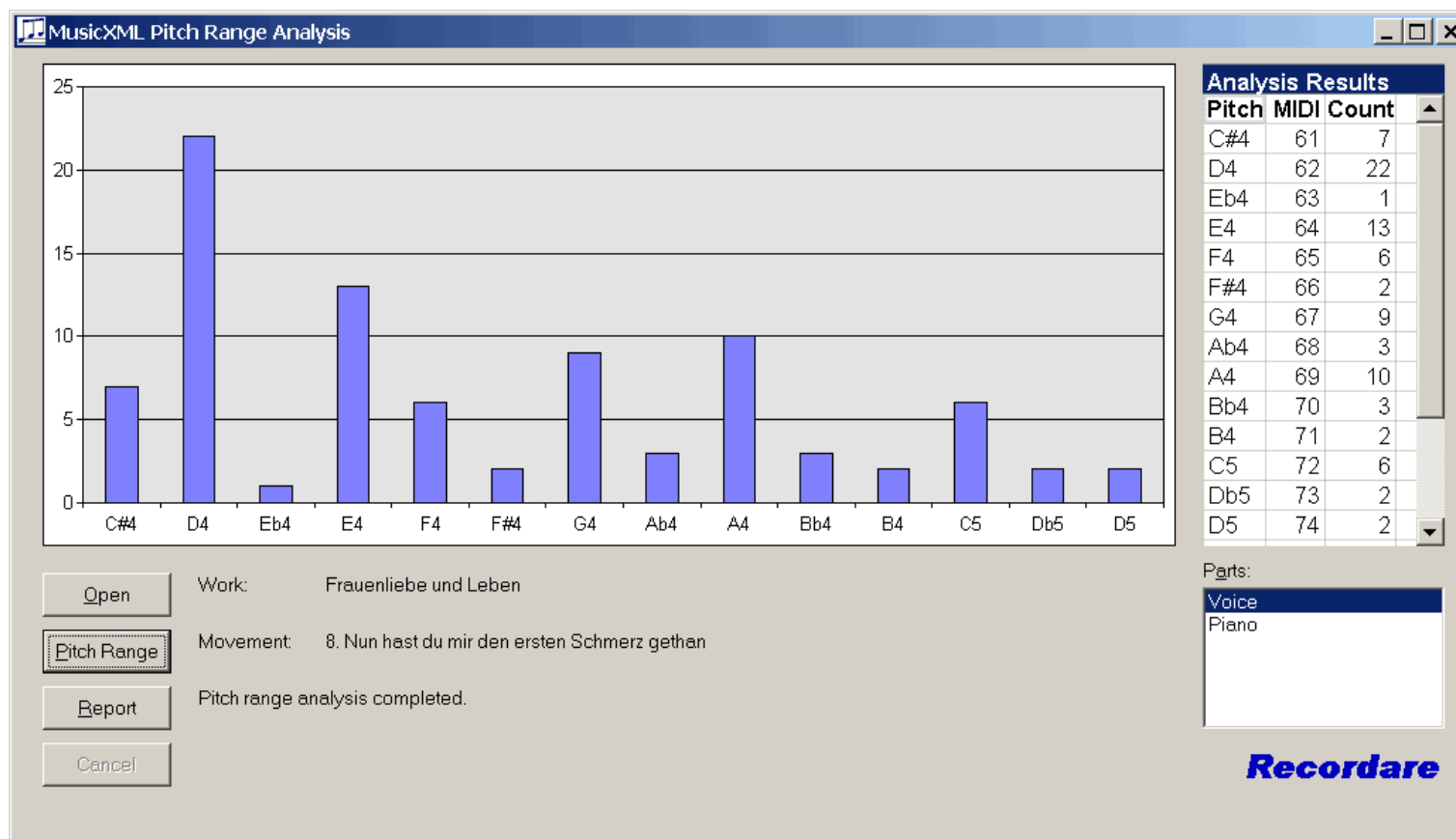


OrganMuse





# Pitch Range Analysis



# Suitability of MusicXML for Digital Music Editions



- ◆ A long term solution
  - XML is a Unicode text format, not binary
  - Open, royalty-free license cannot be undone in the future
  - The only open digital format in widespread use today
- ◆ A complete musical solution for common Western music notation
  - Includes performance, formatting, and editorial levels
  - Two-way link support for images
  - Handles complex repertoire “corner cases”
  - XML limitations tend to be theoretical, not practical
  - Chosen by Indiana University digital library



# Moving Towards Symbolic Digital Music Editions

- ◆ Symbolic digital music editions allow the greatest future use by musicians
  - Interactive performing / critical editions
  - Support performers in creating their own editions
  - New applications like digital music stands
  - Easy repackaging (excerpts, arrangements)
  - Great enabler for musicology research
- ◆ But the cost is reduced publisher control
- ◆ MusicXML allows change at your own pace
  - Increases your options for the future
  - Reduces risk from technology change



# Recommendations

- ◆ Prepare new editions with digital versions in mind
- ◆ Use commercial products with high-quality MusicXML support
  - Overall, Finale is the most complete MusicXML tool today
- ◆ If you are using your own software, add MusicXML support
- ◆ Recordare can help
  - Free MusicXML technical support
  - Software development consulting available



# Future Directions

- ◆ MusicXML 1.2 is currently under development
- ◆ The main goal is to make MusicXML a better distribution format for musicians
- ◆ Adding a standard zip compressed format
- ◆ Also adding incremental new features
- ◆ Let us know if you need something
- ◆ MusicXML mailing list signup at
  - [www.musicxml.org/lists#MusicXML](http://www.musicxml.org/lists#MusicXML)



# For More Information

- ◆ [www.musicxml.org/xml.html](http://www.musicxml.org/xml.html)
- ◆ Site includes
  - Specification (MusicXML DTD)
  - Tutorial
  - Example files
  - Links to MusicXML software
- ◆ MusicXML questions?
  - E-mail to [info@recordare.com](mailto:info@recordare.com)